VERIFICATION OF A TRANSLATION

I, the below named Translator, hereby declare that;

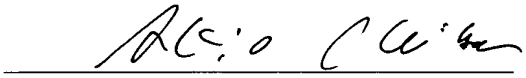
I am the translator of the Japanese specification of U.S. Patent Application under Title of the Invention " POLISHING APPARATUS " filed on the 11th day of May 2005.

That I believe the attached English translation is a true and complete translation of said application as filed.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated this 24th day of August 2006.

Full name of the Declarant: Akio CHIBA

Signature of the Declarant: 

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ATTACHMENT E

SPECIFICATION

POLISHING APPARATUS

TECHNICAL FIELD TO WHICH THE INVENTION PERTAINS

The present invention relates to a chemical/mechanical polishing (CMP) apparatus for use, for example, in planarization of a substrate to be polished, e.g. a semiconductor wafer in particular, and in formation of wiring patterns.

BACKGROUND OF THE INVENTION

Conventionally, a double-layer pad is frequently used as a polishing member bonded to a surface of a table of a chemical/mechanical polishing (CMP) apparatus of the type described above [for example, see Japanese Patent Application Unexamined Publication (KOKAI) No. Hei 6-21028]. This is because polishing pads are required to simultaneously possess two essential qualities, i.e. planarizing ability to flatten steps of wiring patterns, etc. present on a surface of a semiconductor wafer or the like, and ability to maintain the polishing rate uniformity within a wafer surface (intrawafer polishing rate uniformity).

A pad of high hardness is only slightly deformable and hence allows contact pressure to concentrate on convex-areas on a substrate to be polished. Therefore, the high-hardness pad exhibits a superior ability to flatten steps of wiring patterns, etc. present on a semiconductor wafer

or the like. On the other hand, the high-hardness pad is readily influenceable by a large undulation or warpage, thickness variation, etc. that may be present over the whole semiconductor wafer surface. This exerts adverse effects on the intrawafer polishing rate uniformity.

Meanwhile, a pad of low hardness is deformable to a large extent and hence capable of easily following the configuration of an object to be polished. Therefore, the low-hardness pad is not readily influenceable by a large undulation or warpage, thickness variation, etc. in the wafer surface, and allows the intrawafer polishing rate uniformity to be obtained relatively easily. However, the low-hardness pad is inferior in the ability of flattening steps of wiring patterns, etc.

Conventionally, a double-layer pad is used as a polishing pad to solve the problems experienced with a high- or low-hardness polishing pad when used alone, as stated above. More specifically, a pad of relatively high hardness is used as a surface-layer pad member of the double-layer pad, and a pad of low hardness is used as an underlayer pad member of the double-layer pad, thereby allowing the two pad members to compensate for each other's disadvantages, and thus realizing polishing capable of smoothly following an undulation or warpage, thickness variation, etc. that may be present over the whole surface of a semiconductor wafer without losing the ability to flatten steps of wiring patterns, etc. on the wafer surface.

The conventional double-layer polishing pad used in

chemical/mechanical polishing (CMP) apparatus is supplied in a state where the two different types of pad members are bonded to each other and is therefore higher in cost than single-layer polishing pads. Further, when the polishing pad as an expendable article is to be replaced with a new one, it is necessary to change not only the surface-layer pad member, which contributes to the actual polishing process, but also the underlayer pad member at the same time. This causes an increase in the cost of chemical/mechanical polishing (CMP) process.

Further, the intrawafer polishing rate uniformity changes when the elasticity of a pad used as an underlayer pad member varies. Therefore, it is necessary to use double-layer pads having underlayer pad members with minimized variation in elasticity. In this regard, however, every time a double-layer pad is replaced with a new one, a variable factor such as a difference among individual underlayer pad members is introduced.

SUMMARY OF THE INVENTION

The present invention was made in view of the above-described circumstances. Accordingly, an object of the present invention is to provide a polishing apparatus particularly suitable for planarization of an insulator film formed on a semiconductor wafer and for formation of wiring patterns and contacts. That is, a table of a chemical/mechanical polishing (CMP) apparatus is arranged to have the function of the underlayer pad member of the double-layer polishing pad that has heretofore frequently

been used in the chemical/mechanical polishing (CMP) apparatus, thereby enabling cost reduction of chemical/mechanical polishing (CMP) process and allowing stabilization of process performance, such as polishing rate uniformity within a substrate surface to be polished.

To solve the above-described problem, according to a first aspect thereof, the present invention provides a polishing apparatus including a polishing object holding mechanism for holding a polishing object to be polished, and a table having a polishing surface. The polishing object held by the polishing object holding mechanism is pressed against the polishing surface of the table and polished by relative movement between the polishing object held by the holding mechanism and the polishing surface of the table. In the polishing apparatus, an elastic sheet is stretched over the upper surface of the table, and a polishing pad having a polishing surface on the upper side thereof is replaceably stretched over the elastic sheet.

The elastic sheet preferably has a plurality of projections on a surface thereof.

As is stated above, an elastic sheet (preferably having a plurality of projections) is stretched over the upper surface of the table, and a polishing pad having a polishing surface on the upper side thereof is replaceably stretched over the elastic sheet. Thus, the elastic sheet has a function that has heretofore been performed by the underlayer pad member of the conventional double-layer pad. Therefore, when the polishing ability of the polishing pad

has weakened, the polishing tool can be renewed by replacing only the polishing pad with a new one. Thus, the polishing apparatus is capable of reducing the cost of the polishing process and of stabilizing process performance such as polishing rate uniformity within an object to be polished.

A polishing apparatus according to a second aspect of the present invention includes a polishing object holding mechanism for holding a polishing object to be polished, and a table having a polishing surface. The polishing object held by the polishing object holding mechanism is pressed against the polishing surface of the table and polished by relative movement between the polishing object held by the holding mechanism and the polishing surface of the table. In the polishing apparatus, a recess is provided on the upper surface of the table, and the opening of the recess is covered with an elastic sheet to form a fluid chamber. The fluid chamber is filled with a fluid under a predetermined pressure. A polishing pad having a polishing surface on the upper side thereof is replaceably stretched over the elastic sheet.

As is stated above, a recess is provided on the upper surface of the table, and the opening of the recess is covered with an elastic sheet to form a fluid chamber. The fluid chamber is filled with a fluid under a predetermined pressure. A polishing pad having a polishing surface on the upper side thereof is replaceably stretched over the elastic sheet. Thus, the elastic sheet has a function that

has heretofore been performed by the underlayer pad member of the conventional double-layer pad. Therefore, when the polishing ability of the polishing pad has weakened, the polishing tool can be renewed by replacing only the polishing pad with a new one. Thus, it becomes possible to achieve cost reduction of the polishing process and to stabilize process performance such as polishing rate uniformity within an object to be polished.

According to a third aspect of the present invention, the polishing apparatus according to the second aspect is provided with a fluid supply section that supplies the fluid to the fluid chamber. The elastic sheet is deformable according to the supply pressure of the fluid supplied from the fluid supply section.

As is stated above, the polishing apparatus is provided with a fluid supply section that supplies the fluid to the fluid chamber, and the elastic sheet is deformable according to the supply pressure of the fluid supplied from the fluid supply section. Consequently, the amount of deformation of the elastic sheet can be adjusted by controlling the supply pressure of the fluid supplied to the fluid chamber. Accordingly, the polishing apparatus is capable of polishing suitable for the characteristics of each individual object to be polished.

According to a fourth aspect of the present invention, the fluid supply section of the polishing apparatus according to the third aspect includes a fluid path and a fluid source for supplying the fluid. The fluid source has

a control part that controls the supply pressure of the fluid.

As is stated above, the fluid supply section includes a fluid path and a fluid source for supplying the fluid, and the fluid source has a control part that controls the supply pressure of the fluid. Thus, the pressure in the fluid chamber can be controlled as desired, and hence the amount of deformation of the elastic sheet can be adjusted as desired. Therefore, the polishing apparatus is capable of polishing suitable for the characteristics of each individual object to be polished.

According to a fifth aspect of the present invention, the table of the polishing apparatus according to the fourth aspect has a plurality of pistons between the elastic sheet and the polishing pad, and further has a piston guide plate that limits the direction of movement of the pistons. The pistons are guided by the piston guide plate so as to move in a direction perpendicular to the polishing surface of the polishing pad in response to the deformation of the elastic sheet.

As is stated above, the table has a plurality of pistons between the elastic sheet and the polishing pad, and the piston guide plate limits the direction of movement of the pistons. Therefore, the amount of movement of the multiplicity of pistons in the perpendicular direction can be adjusted by controlling the pressure in the fluid chamber. Accordingly, it is possible to perform polishing even more suitable for the characteristics of each

individual object to be polished.

A polishing apparatus according to a sixth aspect of the present invention includes a polishing object holding mechanism for holding a polishing object to be polished, and a table having a polishing surface. The polishing object held by the polishing object holding mechanism is pressed against the polishing surface of the table and polished by relative movement between the polishing object held by the holding mechanism and the polishing surface of the table. In the polishing apparatus, an elastic sheet having a plurality of recesses is stretched over the upper surface of the table so that a fluid is sealed in between the elastic sheet and the upper surface of the table. A polishing pad having a polishing surface on the upper side thereof is replaceably stretched over the elastic sheet.

As is stated above, an elastic sheet having a plurality of recesses is stretched over the upper surface of the table so that a fluid is sealed in between the elastic sheet and the upper surface of the table, and a polishing pad having a polishing surface on the upper side thereof is replaceably stretched over the elastic sheet. Thus, the elastic sheet having a plurality of recesses with the fluid sealed therein performs the function that has heretofore been performed by the underlayer pad member of the conventional double-layer pad. Therefore, when the polishing ability of the polishing pad has weakened, the polishing tool can be renewed by replacing only the polishing pad with a new one. Thus, the polishing

apparatus is capable of reducing the cost of the polishing process and of stabilizing process performance such as polishing rate uniformity within an object to be polished.

A polishing apparatus according to a seventh aspect of the present invention includes a polishing object holding mechanism for holding a polishing object to be polished, and a table having a polishing surface. The polishing object held by the polishing object holding mechanism is pressed against the polishing surface of the table and polished by relative movement between the polishing object held by the holding mechanism and the polishing surface of the table. In the polishing apparatus, the table is formed by a belt suspended between pulleys. An elastic sheet is stretched over the upper surface of the belt. A polishing pad having a polishing surface on the upper side thereof is replaceably stretched over the elastic sheet.

As is stated above, the table is formed by a belt suspended between pulleys, and an elastic sheet is stretched over the upper surface of the belt. Further, a polishing pad having a polishing surface on the upper side thereof is replaceably stretched over the elastic sheet. Thus, the elastic sheet performs the function that has heretofore been performed by the underlayer pad member of the conventional double-layer pad. Therefore, when the polishing ability of the polishing pad has weakened, the polishing tool can be renewed by replacing only the polishing pad with a new one. Thus, the polishing

apparatus is capable of reducing the cost of the polishing process and of stabilizing process performance such as polishing rate uniformity within an object to be polished.

The above and other objects of the invention of this application will become apparent from the following embodiments, which are described with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a sectional side view showing a structural example of the table part of a chemical/mechanical polishing (CMP) apparatus according to the present invention.

Fig. 2 is a sectional side view showing another structural example of the table part of a chemical/mechanical polishing (CMP) apparatus according to the present invention.

Fig. 3 is an enlarged view of part A in Fig. 2, in which Figs. 3(a) and (b) are enlarged views of the part A, and Fig. 3(c) is a B-B sectional view of Figs. 3(a) and (b).

Fig. 4 is a sectional side view showing still another structural example of the table part of a chemical/mechanical polishing (CMP) apparatus according to the present invention.

Fig. 5 is a sectional side view showing a further structural example of the table part of a chemical/mechanical polishing (CMP) apparatus according to the present invention.

Fig. 6 is a sectional side view showing a still

further structural example of the table part of a chemical/mechanical polishing (CMP) apparatus according to the present invention.

Fig. 7 is an A-A sectional view of Fig. 6.

Fig. 8 is a sectional side view showing a still further structural example of the table part of a chemical/mechanical polishing (CMP) apparatus according to the present invention.

Fig. 9 is an enlarged view of part A in Fig. 8, in which Fig. 9(a) is a side view of the part A, and Figs. 9(b) and (c) are sectional views in the direction of the arrow B-B in Fig. 9(a).

Fig. 10 is a sectional side view showing a still further structural example of the table part of a chemical/mechanical polishing (CMP) apparatus according to the present invention.

PREFERRED EMBODIMENTS OF THE INVENTION

Preferred embodiments of the polishing apparatus according to the present invention will be described below with reference to the accompanying drawings.

Fig. 1 is a sectional side view showing a structural example of the table part of a chemical/mechanical polishing (CMP) apparatus according to the present invention. As is illustrated in the figure, a turntable 10 has an elastic sheet 11A secured to the surface thereof as an underlayer member, and a polishing pad 16 is bonded to the surface of the elastic sheet 11A.

The elastic sheet 11A is deformable according to the

pressure applied thereto, e.g. a nonwoven fabric or a porous resin sheet. The elastic sheet 11A is secured to the surface of the turntable 10 by the following method. At the outer edge portion of the turntable 10, the elastic sheet 11A is secured with a plurality of bolts 13 through a ring-shaped retaining member 12. At the center of the turntable 10, the elastic sheet 11A is secured with a bolt 15 through a disk-shaped retaining member 14. It should be noted that the method of securing the elastic sheet 11A to the surface of the turntable 10 is not necessarily limited to the above. The elastic sheet 11A may be bonded to the surface of the turntable 10 by using double-sided adhesive tape or an adhesive, or by jointly using the double-sided adhesive tape or adhesive and the combinations of the ring-shaped retaining member 12 and the bolts 13 and the disk-shaped retaining member 14 and the bolt 15. The elastic sheet 11A is made sufficiently smooth at the upper side thereof so that the polishing pad 16 is removably bondable thereto with double-sided adhesive tape.

The polishing pad 16 is basically a single-layer polishing pad of relatively high hardness (e.g. a polyurethane foam pad) having a polishing surface excellent in step-removing ability. The polishing pad 16 is removably bonded to the surface of the elastic sheet 11A by using double-sided adhesive tape or an adhesive. It should be noted that the polishing pad 16 is not necessarily limited to such a single-layer pad but may be a double-layer polishing pad.

The turntable 10 is rotatable in a predetermined direction by a motor 17. An annular zonal portion of the upper surface of the polishing pad 16, exclusive of the ring-shaped retaining member 12 and the disk-shaped retaining member 14, defines a polishing area 18. A substrate to be polished that is held by a substrate holding mechanism (not shown) is pressed against a polishing surface on the upper side of the polishing pad 16 in the polishing area 18 and polished by relative movement between the polishing pad 16 and the substrate to be polished caused by the rotation of the turntable 10 and the rotation of the substrate holding mechanism (including a top ring, etc.). It should be noted that an abrasive liquid (not shown) is supplied onto the surface of the polishing pad 16.

As is stated above, the polishing pad 16 of relatively high hardness is used as a surface-layer member, and the elastic sheet 11A of low hardness is used as an underlayer member, thereby allowing the polishing pad 16 of relatively high hardness and the elastic sheet 11A of low hardness to compensate for each other's disadvantages; thus realizing polishing capable of smoothly following an undulation or warpage, thickness variation, etc. that may be present over the whole surface of a substrate to be polished while exhibiting the ability to flatten steps of wiring patterns, etc. on the substrate surface. The polishing apparatus is particularly suitable for flattening a substrate, e.g. a semiconductor wafer, and for wiring

pattern formation. When the polishing ability of the polishing pad 16 has weakened, the polishing pad 16 is removed from the elastic sheet 11A, and only the polishing pad 16 is replaced with a new one.

Figs. 2 and 3 show another structural example of the table part of the chemical/mechanical polishing (CMP) apparatus according to the present invention. Fig. 2 is a sectional side view. Figs. 3(a) and (b) are enlarged views of part A in Fig. 2. Fig. 3(c) is a B-B sectional view of Figs. 3(a) and (b). In Figs. 2 and 3, the same reference numerals as those in Fig. 1 denote the same members or portions as those shown in Fig. 1. The same shall apply in the other drawings. In this structural example, a rubber sheet having a multiplicity of projections (circular columnar projections in the illustrated example) 11a provided on a surface thereof is used as an elastic sheet 11B. The projections 11a of the elastic sheet 11B may be provided to project either toward the polishing pad 16 as shown in Fig. 3(a) or toward the turntable 10 as shown in Fig. 3(b). Provision of the projections 11a allows a space to be formed between the elastic sheet 11B and the polishing pad 16 or the turntable 10. The space serves as a relief space. That is, the space permits locally applied pressure to be dispersed to the surroundings and hence allows the elastic projections 11a to be deformed easily. Thus, the polishing pad 16 is effectively deformable to provide even more excellent followability.

The use of a rubber sheet having a multiplicity of

projections 11a provided on a surface thereof as the elastic sheet 11B is advantageous as follows. Because the hardness of the rubber sheet serving as an underlayer member is lower than the hardness of the polishing pad 16 as a surface-layer member, the polishing pad 16 and the elastic sheet 11B can compensate for each other's disadvantages, and it is possible to realize polishing capable of smoothly following an undulation or warpage, thickness variation, etc. that may be present over the whole surface of a substrate to be polished without losing the ability to flatten steps of wiring patterns, etc. on the substrate surface, in the same way as the above. In this case also, the polishing pad 16 is removably bonded to the surface of the elastic sheet 11B with double-sided adhesive tape, an adhesive, etc. When the polishing ability of the polishing pad 16 has weakened, only the polishing pad 16 is replaced with a new one.

Fig. 4 is a sectional side view showing still another structural example of the table part of the chemical/mechanical polishing (CMP) apparatus according to the present invention. As is illustrated in the figure, the surface of the turntable 10 is provided with an annular zonal recess 20a. The opening of the recess 20a is covered with a sheet layer 19 formed of an elastic film or a thin metal sheet to form a fluid chamber 20. The fluid chamber 20 is filled with a gas or fluid under a predetermined pressure.

As is stated above, the turntable 10 is provided with

a recess 20a, and the opening of the recess 20a is covered with a sheet layer 19 to form a fluid chamber 20. Consequently, the amount of deformation with respect to applied pressure is larger at the sheet layer 19 as an underlayer member than at the polishing pad 16 as a surface-layer member. Accordingly, the polishing pad 16 and the sheet layer 19 can compensate for each other's disadvantages, and it is possible to realize polishing capable of smoothly following an undulation or warpage, thickness variation, etc. that may be present over the whole surface of a substrate to be polished without losing the ability to flatten steps of wiring patterns, etc. on the substrate surface, in the same way as the above. The polishing apparatus is particularly suitable for flattening a substrate, e.g. a semiconductor wafer, and for wiring pattern formation. In this case also, the polishing pad 16 is removably bonded to the surface of the sheet layer 19 with double-sided adhesive tape, an adhesive, etc. When the polishing ability of the polishing pad 16 has weakened, only the polishing pad 16 is replaced with a new one.

Fig. 5 is a sectional side view showing a further structural example of the table part of a chemical/mechanical polishing (CMP) apparatus according to the present invention. The chemical/mechanical polishing (CMP) apparatus shown in Fig. 5 differs from that shown in Fig. 4 in that a fluid path 21 is connected to the fluid chamber 20 to supply a pressure fluid thereto, thereby using the fluid chamber 20 as a pressurizing chamber. The

fluid path 21 extends through the center of the motor 17 and is connected to a pressure fluid source 23 through a rotary joint 22. The pressure in the fluid chamber 20, that is, the pressurizing chamber, can be adjusted by controlling the pressure at which the fluid is supplied from the pressure fluid source 23.

As is stated above, a fluid path 21 is connected to the fluid chamber 20 in the turntable 10 to supply a pressure fluid thereto, so that the fluid chamber 20 is used as a pressurizing chamber. With this arrangement, it is possible to adjust the amount of deformation of the sheet layer 19 with respect to applied pressure. Therefore, it is possible to realize polishing capable of smoothly following an undulation or warpage, thickness variation, etc. that may be present over the whole surface of a substrate to be polished without losing the ability to flatten steps of wiring patterns, etc. on the substrate surface. The polishing apparatus is particularly suitable for flattening a substrate, e.g. a semiconductor wafer, and for wiring pattern formation, as in the case of Fig. 4. In this case also, the polishing pad 16 is removably bonded to the surface of the sheet layer 19 with double-sided adhesive tape or an adhesive. When the polishing ability of the polishing pad 16 has weakened, only the polishing pad 16 is replaced with a new one.

Figs. 6 and 7 show a still further structural example of the table part of a chemical/mechanical polishing (CMP) apparatus according to the present invention. Fig. 6 is a

sectional side view, and Fig. 7 is an A-A sectional view of Fig. 6. The chemical/mechanical polishing (CMP) apparatus shown in Figs. 6 and 7 differs from that shown in Fig. 5 in that a multiplicity of pistons 24 are provided between the sheet layer 19 and the polishing pad 16. When the sheet layer 19 is pressed by the action of the fluid chamber 20 (pressurizing chamber), the pistons 24 are pressed by the sheet layer 19 to move up and down.

The pistons 24 are guided vertically through a piston stroke PS by a piston guide plate 25. The sheet layer 19 is secured to the upper end surface of the turntable 10 with a plurality of bolts 27 through a ring-shaped retaining member 26. The piston guide plate 25 is secured to the upper surface of the ring-shaped retaining member 26 with bolts 28.

As is stated above, a multiplicity of pistons 24 are provided on the upper surface of the sheet layer 19 in such a manner as to be guided vertically through a piston stroke PS by a piston guide plate 25. With this arrangement, the amount of deformation of the sheet layer 19 can be adjusted by the pressure in the fluid chamber 20, and consequently the amount of vertical movement of the pistons 24 can also be adjusted. Accordingly, it is possible to realize polishing capable of smoothly following an undulation or warpage, thickness variation, etc. that may be present over the whole surface of a substrate to be polished without losing the ability to flatten steps of wiring patterns, etc. on the substrate surface. The polishing apparatus is

particularly suitable for flattening a substrate, e.g. a semiconductor wafer, and for wiring pattern formation. In this case also, the polishing pad 16 is removably bonded to the pistons 24 and to the surface of the piston guide plate 25 with double-sided adhesive tape, an adhesive, etc. When the polishing ability of the polishing pad 16 has weakened, only the polishing pad 16 is replaced with a new one.

Figs. 8 and 9 show a still further structural example of the table part of a chemical/mechanical polishing (CMP) apparatus according to the present invention. Fig. 8 is a sectional side view. Fig. 9(a) is an enlarged view of part A in Fig. 8. Figs. 9(b) and (c) are sectional views in the direction of the arrow B-B in Fig. 9(a). In Figs. 8 and 9, a rubber sheet having a multiplicity of recesses (circular or pentagonal recesses in the illustrated example) 11b provided on a surface thereof is used as an elastic sheet 11C. As is shown in Fig. 9(a), the opening portions of the recesses 11b of the elastic sheet 11C are bonded to the upper end surface of the turntable 10 with an adhesive. A fluid is sealed in each recess 11b.

As is stated above, a rubber sheet provided on a surface thereof with a multiplicity of recesses 11b each having a fluid sealed therein is used as an elastic sheet 11C. Consequently, the hardness of the elastic sheet 11C serving as an underlayer member is lower than that of the polishing pad 16 as a surface-layer member (the hardness of the elastic sheet 11C is adjustable by the pressure of the fluid sealed in the recesses 11b). Accordingly, the

polishing pad 16 and the elastic sheet 11C can compensate for each other's disadvantages, and it is possible to realize polishing capable of smoothly following an undulation or warpage, thickness variation, etc. that may be present over the whole surface of a substrate to be polished without losing the ability to flatten steps of wiring patterns, etc. on the substrate surface. The polishing apparatus is particularly suitable for flattening a substrate, e.g. a semiconductor wafer, and for wiring pattern formation. In this case also, the polishing pad 16 is removably bonded to the surface of the elastic sheet 11C with double-sided adhesive tape, an adhesive, etc. When the polishing ability of the polishing pad 16 has weakened, only the polishing pad 16 is replaced with a new one.

Fig. 10 is a sectional side view showing a still further structural example of the table part of a chemical/mechanical polishing (CMP) apparatus according to the present invention. The table of this polishing apparatus is formed by a belt 31 suspended between pulleys 29 and 30. An elastic sheet 11D is bonded to the upper surface of the belt 31. Further, a polishing pad 16 is removably bonded to the upper surface of the elastic sheet 11D with double-sided adhesive tape, an adhesive, etc. As the elastic sheet 11D, an elastic sheet having the same structure as those shown in Figs. 3 and 9 can be used. The pulley 29 is driven to rotate in the direction of the arrow C by a motor (not shown), and the belt 31 travels in the direction of the arrow D.

A substrate W to be polished that is held by a substrate holding mechanism (including a top ring, etc.) 32 is pressed against the polishing pad 16 bonded to the upper surface of the belt 31 through the elastic sheet 11D as is stated above, and the substrate holding mechanism 32 is rotated in the direction of the arrow D, thereby polishing the substrate W. In this case also, when the polishing ability of the polishing pad 16 has weakened, only the polishing pad 16 is replaced with a new one. Thus, the table part of the chemical/mechanical polishing (CMP) apparatus may be of a belt type (linear type). The linear table also offers the same operational advantages as those obtained by the above-described turntable 10.

As has been stated above, the embodiments shown in Figs. 1, 2, 3, 8, 9 and 10 use the pressure-deformable elastic sheet 11 (11A to 11D) as an underlayer member. The embodiments shown in Figs. 4, 5, 6 and 7 use as an underlayer mechanism the sheet layer 19 displaceable by the pressure in the fluid chamber 20 (pressurizing chamber) or a combination of the sheet layer 19 and the pistons 24. Thus, the table is arranged to have the function that has heretofore been performed by the underlayer pad member of the conventional double-layer polishing pad used in chemical/mechanical polishing (CMP) apparatus. When the polishing ability of the polishing pad 16 has weakened, only the polishing pad 16 is replaced with a new one. Accordingly, it is possible to achieve cost reduction of chemical/mechanical polishing (CMP) process and to

stabilize process performance such as polishing rate uniformity within a substrate surface to be polished.

It should be noted that the present invention is not necessarily limited to the foregoing embodiments. It is essential only that the polishing apparatus have a polishing pad bonded over a pressure-deformable underlayer member or underlayer mechanism provided over the upper surface of a table, and that the polishing pad be replaceable from the underlayer member or the underlayer mechanism. In other words, the polishing apparatus may have any structure, provided that the table has the function that has heretofore been performed by the underlayer pad member of the conventional double-layer polishing pad used in chemical/mechanical polishing (CMP) apparatus, and when the polishing ability of the polishing pad has weakened, the polishing pad is replaceable with a new one.